

Appl. No. 09/823,927
Amdt. Dated May 3, 2004
Reply to Office Action of December 3, 2002

Attorney Docket No. 81784.0232
Customer No. 26021

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended): A driving apparatus for a display device, comprising:

a driving circuit for generating a signal to allow a display section to display, said driving circuit having a digital signal processing circuit for processing a digital signal, a digital-to-analog converter circuit for converting a digital signal to an analog signal, and an analog signal processing circuit for processing an analog signal; and

a power supply circuit for generating a supply voltage for said driving circuit; wherein

said power supply circuit reduces the supply voltage supplied to said digital-to-analog converter circuit and to said analog signal processing circuit, from the supply voltage during the normal operation to a voltage which still allows said digital-to-analog converter circuit and said analog signal processing circuit to operate, when a predetermined power save is instructed.

2. (Previously presented): A driving apparatus for a display device according to claim 1, wherein said power supply circuit comprises:

a boosting section for boosting the supply voltage;

a feedback section for detecting the supply voltage at the output end of the power supply as a resistor divided voltage, comparing the detected voltage with a reference voltage, and controlling said boosting section so that said supply voltage is constant;

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a plurality of resistive elements each with a different resistance value and connected to said output end of the power supply for detecting said supply voltage; and

a selector switch for selecting a resistive element to be connected to said feedback section from among said plurality of resistive elements; wherein

a divided voltage value of said supply voltage input to said feedback section is adjusted in response to the resistance value of the resistive element selected by said selector switch, and the output supply voltage to said digital-to-analog converter circuit and to said analog signal processing circuit is changed.

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3. (Original): A driving apparatus for a display device according to claim 2, wherein

a resistive element with a lower resistance value is selected by said selector switch when reduction in the output supply voltage is desired so that the divided voltage value input to said feedback section is increased.

4. (Original): a driving apparatus for a display device according to claim 1, wherein

said power supply circuit comprises:

a boosting section for boosting the input voltage;

a boosted power supply output switch for controlling passage between said boosting section and said output end of power supply; and

a non-boosted power supply output switch for bypassing the input and said output ends of power supply; wherein

said two types of output switches are switched and controlled such that one of the boosted or non-boosted supply voltages is output to said digital-to-analog converter circuit and to said analog signal processing circuit.

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5. (Original): A driving apparatus for a display device according to claim 1, wherein

said power supply circuit comprises:

a boosting section, including a plurality of capacitors and a plurality of switches for capacitors, for boosting an input voltage by switching and controlling said plurality of switches for capacitors;

a boosted power supply output switch for controlling the passage between said boosting section and output end of the power supply; and

a non-boosted power supply output switch for bypassing the input and said output ends of the power supply; wherein

a power supply clock produced by said driving circuit using the system clock is used for switching and controlling said plurality of switches for capacitors; and

one of the boosted or non-boosted supply voltages is output to said digital-to-analog converter circuit and to said analog signal processing circuit, or the output of said supply voltage to these circuits is suspended in response to the switching control of said output switch and said power supply clock.

6. (Previously presented): A driving apparatus for a display device according to claim 5, wherein

said driving circuit determines a current mode from a boosted power supply generating mode, a non-boosted power supply generating mode, or a power supply suspension mode based on a predetermined power save control instruction, and based on the determination controls supply and suspension of supply of said power supply clock or supply and suspension of supply of the clock from an oscillation circuit, and opening/closing of said output switches of said power supply circuit.

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7. (Original): A driving apparatus for a display device according to claim 1, wherein

said power supply circuit comprises:

a boosting section, including a plurality of capacitors and a plurality of switches for capacitors, for boosting the input voltage by switching and controlling said switches for capacitors;

a boosted power supply output switch for controlling the passage between said boosting section and output end of the power supply; and

a non-boosted power supply output switch for bypassing the input and said output ends of the power supply; wherein

a clock from a predetermined oscillation circuit is used for the switch control of said plurality of switches for capacitors; and

one of the boosted or non-boosted supply voltages is output to said digital-to-analog converter circuit and to said analog signal processing circuit, or the output of said supply voltage to these circuits is suspended in response to the switching control of said output switches and the clock from said oscillation circuit.

8. (Original): A driving apparatus for a display device according to claim 1, wherein

said digital-to-analog converter circuit includes a plurality of voltage dividing resistive elements connected in series to the power supply from said power supply circuit, divides said supply voltage into a plurality of stages by said voltage dividing resistive elements, selects a divided voltage corresponding to the digital data, and outputs an analog signal.

9. (Previously presented): A driving apparatus for a display device according to claim 8, wherein said power supply circuit comprises:

a boosting section for boosting the supply voltage;

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a feedback section for detecting the supply voltage at the output end of the power supply as a resistor divided voltage, comparing the detected voltage with a reference voltage, and controlling said boosting section so that said supply voltage is maintained;

a plurality of resistive elements each with a different resistance value and connected to said output end of the power supply for detecting said supply voltage; and

a selector switch for selecting a resistive element to be connected to said feedback section from among said plurality of resistive elements; wherein

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a divided voltage value of said supply voltage input to said feedback section is adjusted in response to the resistance value of the resistive element selected by said selector switch, and the output supply voltage to said digital-to-analog converter circuit and to said analog signal processing circuit is changed.

10. (Original): A driving apparatus for a display device according to claim 9, wherein

a resistive element with lower resistance value is selected by said selector switch when reduction in the output supply voltage is desired so that the divided voltage value input to said feedback section is increased.

11. (Original): A driving apparatus for display device according to claim 8, wherein

said power supply circuit comprises:

a boosting section for boosting the input voltage;

a boosted power supply output switch for controlling passage between said boosting section and said output end of power supply; and

a non-boosted power supply output switch for bypassing the input and said output ends of power supply; wherein

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said two types of output switches are switched and controlled so that one of the boosted or non-boosted supply voltage is output to said digital-to-analog converter circuit and to said analog signal processing circuit.

12. (Original): A driving apparatus for a display device according to claim 8, wherein

said power supply circuit comprises:

a boosting section, including a plurality of capacitors and a plurality of switches for capacitors, for boosting an input voltage by switching and controlling said plurality of switches for capacitors;

a boosted power supply output switch for controlling the passage between said boosting section and output end of the power supply; and

a non-boosted power supply output switch for bypassing the input and said output ends of the power supply; wherein

a power supply clock produced by said driving circuit using the system clock is used for switching and controlling said plurality of switches for capacitors; and

one of the boosted or non-boosted supply voltages is output to said digital-to-analog converter circuit and to said analog signal processing circuit, or the output of said supply voltage to these circuits is suspended in response to the switching control of said output switch and said power supply clock.

13. (Previously presented): A driving apparatus for a display device according to claim 12, wherein

said driving circuit determines the current mode from a boosted power supply generating mode, a non-boosted power supply generating mode, or a power supply suspension mode, based on a predetermined power save control instruction, and based on the determination, controls supply and suspension of supply of said

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power supply clock, or supply and suspension of supply of the clock from said an oscillation circuit, and opening/closing of said output switches of said power supply circuit.

14. (Original): A driving apparatus for a display device according to claim 8, wherein

said power supply circuit comprises:

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a boosting section, including a plurality of capacitors and a plurality of switches for capacitors, for boosting the input voltage by switching and controlling said switches for capacitors;

a boosted power supply output switch for controlling the passage between said boosting section and output end of the power supply; and

a non-boosted power supply output switch for bypassing the input and said output ends of the power supply; wherein

a clock from a predetermined oscillation circuit is used for the switch control of said plurality of switches for capacitors; and

one of the boosted or non-boosted supply voltages is output to said digital-to-analog converter circuit and to said analog signal processing circuit, or the output of said supply voltage to these circuits is suspended in response to the switching control of said output switches and the clock from said oscillation circuit.

15. (Currently amended): A driving circuit for a display device for generating a signal to allow a display section to display, said driving circuit comprising:

a digital signal processing circuit for processing a digital signal;

a digital-to-analog converter circuit for converting a digital signal to an analog signal; and

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an analog signal processing circuit for processing an analog signal;
wherein

when a predetermined power save is instructed, said digital-to-analog converter circuit operates to perform a digital-to-analog conversion process and said analog signal processing circuit ~~operate~~ operates to process an analog signal with a supply voltage which is less than the supply voltage during normal operation and which still allows said digital-to-analog converter circuit and said analog signal processing circuit to operate.

short
16. (Previously presented): A driving apparatus for a display device, comprising:

a driving circuit for generating a signal to allow a display section to display, said driving circuit having a digital signal processing circuit for processing a digital signal, a digital-to-analog converter circuit for converting a digital signal to an analog signal, and an analog signal processing circuit for processing an analog signal; and

a power supply circuit for generating a supply voltage for said driving circuit; wherein

when a predetermined power save is instructed, said power supply circuit reduces the supply voltage supplied to said digital-to-analog converter circuit and to said analog signal processing circuit, from the supply voltage during normal operation to a voltage which allows said digital-to-analog converter circuit and said analog signal processing circuit to operate and said display section to display.

17. (Currently amended): A driving apparatus for a display device according to claim 16, wherein

as said instruction of predetermined power save, at least two instructions exist, the first being an output instruction of a power save supply

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voltage which is lower than an output supply voltage from said power supply circuit during normal operation and the second being a stop instruction of an output voltage from said power supply circuit, and

when the output of said power save supply voltage is instructed, said power supply circuit sets, as said power save supply voltage, the supply voltage to be supplied to said digital-to-analog converter circuit and to said analog signal processing circuit to a voltage which is lower than the supply voltage during normal operation and which allows said digital-to-analog converter circuit and said analog signal processing circuit to operate and said display section to display.

18. (Previously presented): A driving circuit for a display device for generating a signal to allow a display section to display, said driving circuit comprising:

a digital signal processing circuit for processing a digital signal;

a digital-to-analog converter circuit for converting a digital signal to an analog signal; and

an analog signal processing circuit for processing an analog signal;
wherein

when a predetermined power save is instructed, said digital-to-analog converter circuit and said analog signal processing circuit operate with a supply voltage less than the supply voltage during normal operation to a voltage which allows said display section to display.

19. (Previously presented): A driving circuit for a display device according to claim 18, wherein

as said instruction of predetermined power save, at least two instructions exist, the first being an output instruction of a power save supply voltage which is lower than an output supply voltage from said power supply circuit

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during normal operation and the second being a stop instruction of an output voltage from said power supply circuit, and

when the output of said power save supply voltage is instructed, said digital-to-analog converter circuit and said analog signal processing circuit operates with said power save supply voltage which is less than the supply voltage during normal operation and which allows said display section to display.
